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two pole pieces having mutually interlaced poles, the poles having grooves profiled substantially axially along peripheral sides of each pole body, the magnet interposed in the grooves between two interlaced poles, the groove profile preventing the magnet from escaping perpendicularly from the grooves;

a strip of nonmagnetic material less hard than the magnet, the strip interposed between the magnet and a portion of at least one of the grooves, the strip covering a circumferential face of the magnet oriented in a direction opposite to a shaft of the alternator; and

a layer of adhesive more flexible than the magnet, the layer of adhesive interposed between the strip and the magnet.

REMARKS

Claims 1-30 are pending.

Claims 1-30 were rejected.

Claims 1, 16, and 30 are independent claims.

Claims 1, 16, and 30 are amended herein.

Reference Citation Requested

The Applicants note that the Irie et al reference (US 5,973,435) was utilized by the Office in the Office Action of 06/07/00 (i.e., paper 4) but not listed in the attached PTO-892 Notice of References Cited. The Irie et al. was not submitted by the Applicants in an Information Disclosure Statement or accompanying PTO-1449. Accordingly, the Applicants respectfully request issuance of a supplemental PTO-892 indicating examination this application with respect to the Irie et al. reference, so that the reference is properly noted on the issued patent.

Rejections Under 35 U.S.C. § 112

Claims 1-30 were rejected under 35 U.S.C. § 112 ¶ 2 as being indefinite for failing to particularly point out and distinctly claim the subject matter of the invention. The Office alleges that "the strip being produced from a material less hard than the magnet" is indefinite because the clause "a material less hard than the magnet" does not clearly cite any metes and bounds for the limitation.

The Applicants have amended Claims 1, 16, and 30 herein to recite that the strip is produced from a nonmagnetic material that is less hard than the magnet. While maintaining the definiteness of the previously presented claims, the Applicant has amended independent claims 1, 16, and 30 in accordance with the suggestion of the Office merely in the interest of continuing prosecution of this application.

The Applicants note that the claimed invention solves the problem of fastening a magnet that is engaged in grooves of two claw poles associated with two different plates of an alternator, a North plate and a South plate (Each pole piece comprises a plate 8 and a claw shaped pole 10 that extends from the plate toward the plate of the opposing pole piece. Figure 1.) Thus, the strip may be produced from a nonmagnetic material in order to avoid magnetic leakage between claws. As is known, inter-pole magnets interposed between adjacent claws reduce the leakage of magnetic flux and contribute to reinforcing the magnetic flux. Specification p. 1, ln. 11-16. In addition to the use of a nonmagnetic material for the strip to avoid magnetic leakage, the invention further contemplates a symmetric arrangement of the magnets in the grooves to further preserve the magnetic field in the inductor. Specification p. 2, ln. 11-21. Accordingly, the specification provides support for the recitation of the strip being produced from a nonmagnetic material. Therefore, the Applicants respectfully request withdrawal of this rejection since the amended recitation has been acknowledged as definite by the Office.

However, with respect to the previously presented claims, the Applicants must strenuously disagree with both their rejection and the Office's rational for their rejection. The Office presents a hypothetical embodiment characterized as "unlikely but [just] for the sake of argument", which allegedly renders the previously presented claim language indefinite. In that example, the Office chooses a plastic magnet to fabricate the claimed alternator's magnets and a nonmagnetic material, such as aluminum or stainless steel, to fabricate the strips. The Office alleges that these choices of material raise a questionable issue whether the plastic magnet or the nonmagnetic strip of aluminum or stainless steel is less hard than the other. The Office also questions the definiteness of the term "less hard", which is alleged to be indefinite if without a specific and finite comparison.

The Applicants respectfully disagree with the statement that one skilled in the art would not be able to determine the relative hardness of the materials selected by the Office and further submit that the Office utilizes an improper standard in issuing the rejection. In particular, the

Office's questions concerning various characteristics of the material of the strip are not germane to the patentability of the claimed invention since, according to the claims, the material of the strip must only be less hard than the magnet. Moreover, the claimed characteristic of the material of the strip (less hard than the magnet) is well defined as the hardness (eg., Rockwell hardness) of magnets and other materials is well known to those skilled in the art of the invention. American Society for Metals, Metals Handbook, p, 785-97 (Taylor Lyman ed., 8th ed., 1961). Accordingly, one skilled in the art can readily select a strip material that is less hard than any chosen magnetic material and construct the claimed invention or could readily determine whether the material of a chosen strip is less hard than a chosen magnet and thus forms the claimed invention. Therefore, despite the allegations of the Office, one of skill in the art can readily determine whether there would be patent infringement of the claims.

The Applicants generally claim a strip produced from a material less hard than the magnet. In that manner, the Applicants claim the invention as broadly as is both possible and proper. The man of skill in the art is able to choose the best non rigid material to solve his problem in view of his own manufacturing tolerances when utilizing the Applicants' claimed invention. Thus, while skilled practitioners of the art may use aluminum or another metallic material less rigid than magnet for the strip of the alternator disclosed and claimed by the Applicants, in the Applicants' preferred embodiment and consistent with the Applicants' individual manufacturing tolerances, the strip is glass fiber. Nevertheless, the particular material chosen is not critical to the invention so long as the chosen material is less hard than the magnet. For this reason, the Applicants generally claim the strip as being produced from material less hard than the magnet. Specification p. 2, ln. 1-4, p. 5, ln. 28-32 and claim 1, 16, and 30. The Applicants respectfully submit that this recitation is reasonably defined to one skilled in the art of the invention.

A decision on whether a claim is invalid under section 112 requires a determination of whether those skilled in the art would understand what is claimed when the claim is read in light of the specification. Orthokinetics, Inc. v. Safety Travel Chairs, Inc., 1 USPQ2d 1081, 1088 (Fed. Cir. 1986). Patent law does not require that all possibilities corresponding to all embodiments of an invention be listed in a specification, let alone that they be listed in the claims. Manual of Patent Examining Procedure § 2173.05 (b) (7th ed. 1997); See Orthokinetics, 1 USPQ2d 1081 (Fed. Cir. 1986). Definiteness is analyzed in light of 1) the content of the patent

application disclosure, 2) the claim interpretation that would be given by one of ordinary skill in art at the time the invention was made, and 3) the teachings of the prior art. *In re Wiggins*, 488 F.2d 538, 179 U.S.P.Q. 421, 423-24 (C.C.P.A. 1973).

Here, the claims and the specification clearly state that the strip is produced from a material that is less hard than the magnet. Once a magnetic material has been selected for the claimed invention, one skilled in the art can clearly and precisely select a material for the strip that is less hard than the chosen magnetic material or determine the same for an already constructed alternator. Read in light of the specification, the claims reasonably apprise those skilled in the art of the use and scope of the invention and the language utilized is as precise as the subject matter permits. *Shatterproof Glass Corp v. Libbey-Owens Ford Co.*, 225 U.S.P.Q. 634, 641 (Fed. Cir.), *cert. dismissed*, 474 U.S. 976 (1985). The breadth of the Applicant's claims should not to be equated with indefiniteness. *In re Rasmussen*, 650 F.2d 1212, 1215, 211 U.S.P.Q. 323, 326 (C.C.P.A. 1981).

Accordingly, the Applicants respectfully submit that claims 1-30, as previously presented, are definite under Section 112 and requests withdrawal of their rejection.

Rejection Under 35 U.S.C. § 103(a)

Claims 1-4, 12-19 and 27-29 were rejected under 35 U.S.C. § 103(b) as being unpatentable over XP-000726444 (hereinafter "XP'444") in view of Ragaly (EP 0837-538-A), which corresponds to Ragaly (US 6,144,138).

The Office asserts that XP'444 discloses an alternator comprising two claw poles interlacing, the claw poles having a groove that accommodates at least one magnet. Further, the Office asserts that Ragaly discloses an alternator having magnets embedded into the pole piece, wherein the claw pole's groove accommodates at least one magnet, and a strip interposed between one face of the magnet and the groove, wherein the [s]trip covers the magnet's circumferential face that is oriented in a direction opposite to the alternator's shaft.

Claims 5-8 and 20-23 were rejected under 35 U.S.C. § 103(b) as being unpatentable over XP'444 and Ragaly in view of the ordinary skill of a worker in the art. The Office asserts that XP'444 and Ragaly disclose the claimed invention, except for the added limitations of two strips interposed opposite surfaces of the magnet, or the groove U-shaped, or the groove V-shaped.

Claims 9, 24 and 30 were rejected under 35 U.S.C. § 103(b) as being unpatentable over XP'444 and Ragaly in view of Yamada et al. (US 5,734,216). The Office asserts that XP'444 and Ragaly disclose the claimed invention, except for the added limitation of a layer of adhesive between the strip and the magnet, allegedly disclosed by Yamada et al.

Claims 10-11 and 25-26 were rejected under 35 U.S.C. § 103(b) as being unpatentable over XP'444 and Ragaly in view of Mitcham et al. (US 5,877,578), which is alleged to teach a permanent magnet comprising a plurality of separate magnet parts that are bonded together. The Office asserts such a combination to be obvious to one having skill in the art as XP'444 and Ragaly allegedly disclose the claimed invention, except for the added limitation of the magnet including two separate parts bonded together by a layer of adhesive material.

The Applicants have amended independent claims 1, 16, and 30 to recite generally that poles include grooves profiled substantially axially along peripheral sides of each pole body. Accordingly, the Applicant respectfully submits that these claims are patentable because XP'444 and Ragaly, individually and collectively, fail to teach or suggest interlaced poles including grooves substantially axially along peripheral sides of each pole body. In addition, neither reference discloses, suggests, or provides the motivation, individually or in combination, to one skilled in the art to combine the references in the manner claimed by the Applicant, as suggested by the Office.

Amended claim 1 recites an alternator comprising, in part, two pole pieces having mutually interlaced poles, and a magnet, the poles including grooves profiled substantially axially along peripheral sides of each pole body, wherein the grooves engage the magnet between two interlaced poles, the groove profile preventing the magnet from escaping perpendicularly from the grooves.

The Office acknowledges that XP'444 fails to teach Claim 1. XP'444 does not disclose a strip interposed between a face of the magnet and the groove. XP'444 merely teaches disposed between claw pole fingers are magnets divided in two equal sections that are glued or otherwise affixed to the surface of a claw finger while having common surfaces that are free to slide past each other. Moreover, the provided text of XP'444 fails to disclose that there is a groove in the claw pole fingers. Further, XP'444 fails to disclose or suggest that a strip be interposed between a face of the magnet and the groove to take up play due to manufacturing tolerances and deformation due to forces and heating caused by the rotation of the rotor.

Ragaly fails to correct this deficiency acknowledged by the Office. Ragaly reference numeral (25) is not a claw pole's groove as asserted by the Office but an undercut. Ragaly discloses a generator with claw type magnet poles (17) attached to a field spider disk or plate (15). The undercut (25) belongs to a groove which is only in the plate (15), not in the claw pole. Ragaly col. 4, ln. 8-20 and claim 1 of US Patent No. 6,144,136. The rotor comprises two magnetic plates: a North plate and a South plate (polarity being defined par the current direction circulating in the excitation coil 9). There are not grooves in claw (17) of Ragaly and for this reason, to prevent radial bulging of the magnet legs (43), Ragaly provides a toothed disk (51). Ragaly col. 6, ln. 9-14 of US Patent No. 6,144,136.

In sharp contrast, the claimed invention recites two pole pieces having mutually interlaced poles including grooves profiled substantially axially along peripheral sides of each pole body and is clearly distinguishable from the cited references. It is to be noted that the specification describes each pole piece as having a plate 8 and claw shaped poles 10 that extend from the plate towards the plate of the other interlaced pole piece. Accordingly, the Applicants submit that amended claim 1 is patentable over the cited references. Additionally, claims 2-15, which depend and include all of the limitations of independent claim 1 are also believed patentable based on such dependency as well as further limitation contained therein. In further support of such statement, the Applicants submit that the secondary references, Yamada et al. and Mitcham et al., fail to disclose or suggest mutually interlaced poles including grooves profiled substantially axially along peripheral sides of each pole body.

Claim 16, which has been amended in a manner similar to Claim, recites an alternator comprising, in part, two pole pieces having mutually interlaced poles, the poles having grooves profiled substantially axially along peripheral sides of each pole body, the magnet interposed in the grooves between two interlaced poles, the groove profile preventing the magnet from escaping the grooves in a plane perpendicular to the groove profile. Therefore, the Applicant again respectfully submits that there is neither the disclosure nor the suggestion in XP'444 , Ragaly, Yamada et al., or Mitcham et al. for such grooves along peripheral sides of each pole body. Accordingly, Claim 16 is believed to patentable over the prior art of record.

Claims 17-29 depend from and include all of the limitations of independent claim 16. As independent claim 16 is believed patentable, dependent claims 17-19 and 27-29 are also believed patentable based on such dependency as well as further limitation contained therein.

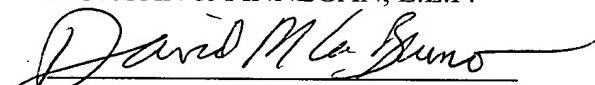
Similarly, claim 30, which recites the alternator of the invention in alternative terms, has been amended in to recite two pole pieces having interlaced poles, the poles having grooves profiled substantially axially along peripheral sides of each pole body, the magnet interposed in the grooves between two interlaced poles, the groove profile preventing the magnet from escaping perpendicularly from the grooves. For this reason, the Applicant reiterates the remarks above and respectfully submits that claim 30 is allowable over the cited references.

Conclusion

Based on the foregoing remarks, it is respectfully submitted that all of the claims as currently pending are patentable and in condition for allowance. Reconsideration of the application and withdrawal of the rejections are respectfully requested.

In the event that a telephone conference would facilitate examination in any way, the Examiner is invited to contact the undersigned representative at the number provided.

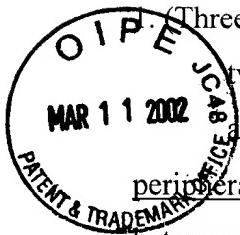
Respectfully submitted,
MORGAN & FINNEGAN, L.L.P.



David M. La Bruno Reg. No. 46,266

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MORGAN & FINNEGAN, L.L.P.
345 Park Avenue
New York, New York 10154-0053
(212) 758-4800 Telephone
(212) 751-6849 Facsimile

CLAIMS MARKED TO SHOW CHANGES MADE

Three Times Amended) An alternator for a vehicle, comprising two pole pieces having mutually interlaced poles, and a magnet, the poles including grooves profiled substantially axially along [an axis] peripheral sides of each pole body, wherein the grooves [accommodating] engage the magnet between [the] two interlaced poles [of the pole pieces], the groove profile [completely] preventing the magnet from escaping perpendicularly from the grooves [in a plane perpendicular to the axis], and

a strip interposed between a face of the magnet and a first portion of at least one of the grooves, the strip being produced from a nonmagnetic material which is less hard than the magnet.

2. The alternator as claimed in claim 1, wherein the strip is interposed between the magnet and the first portion of each of the grooves.
3. The alternator as claimed in claim 1 wherein the strip covers a circumferential face of the magnet.
4. The alternator as claimed in claim 3, wherein the circumferential face is oriented in a direction opposite to a shaft of the alternator.
5. The alternator as claimed in claim 1, which comprises two strips interposed between respective opposed faces of the magnet and the first portion and a second portion respectively of at least one of the grooves.
6. The alternator as claimed in claim 1, wherein the groove profile of each groove is "U"-shaped.
7. The alternator as claimed in claim 1, wherein the groove profile of each groove is "V"-shaped, the "V"-shaped groove profile having a first branch which is locally parallel to a circumferential face of the poles.

8. The alternator as claimed in claim 7, wherein the "V"-shaped groove profile has two branches, the first branch closer to a shaft of the alternator than the other branch.
9. The alternator as claimed in claim 1, further comprising a layer of adhesive which is more flexible than the magnet and is interposed between the strip and the magnet.
10. The alternator as claimed in claim 9, wherein the magnet includes two separate parts bonded to one another by a layer of material which is more flexible than the magnet.
11. The alternator as claimed in claim 10, wherein the material is identical to the adhesive.
12. The alternator as claimed in claim 1 having a plurality of magnets and a plurality of strips, wherein at least two of the plurality of magnets are associated with respective strips.
13. The alternator as claimed in claim 12, wherein a majority of the magnets are associated with respective strips.
14. The alternator as claimed in claim 12, wherein the strips comprise parts that are independent of one another.
15. The alternator as claimed in claim 1, wherein the strip comprises glass fiber embedded in pre-impregnated plastic.
16. (Two Times Amended) An alternator for a vehicle, the alternator comprising:
 - a magnet;
 - two pole pieces having mutually interlaced poles, the poles having grooves profiled substantially axially along [an axis] peripheral sides of each pole body, the magnet interposed in the grooves [and] between two interlaced poles, the groove profile preventing the magnet from escaping the grooves in a plane perpendicular to the [axis] groove profile; and

a first strip of nonmagnetic material less hard than the magnet, the first strip interposed between the magnet and a first portion of at least one of the grooves.

17. The alternator of claim 16 wherein the first strip is interposed between the magnet and the first portion of each of the grooves.

18. The alternator of claim 16 wherein the first strip covers a circumferential face of the magnet.

19. The alternator of claim 18 wherein the circumferential face is oriented in a direction opposite to a shaft of the alternator.

20. The alternator of claim 16 further comprising a second strip of material, the first strip and the second strip interposed between respective opposed faces of the magnet and the first portion and a second portion respectively of at least one of the grooves.

21. The alternator of claim 16 wherein each groove is "U"-shaped.

22. The alternator of claim 16 wherein each groove is "V"-shaped, with a first branch of each "V"-shaped groove locally parallel to a circumferential face of the poles.

23. The alternator of claim 22 wherein the first branch is closer to a shaft of the alternator than the other branch of the "V"-shaped groove.

24. The alternator of claim 16 further comprising a layer of adhesive more flexible than the magnet, the layer of adhesive interposed between the first strip and the magnet.

25. The alternator of claim 24 wherein the magnet includes two separate magnet portions bonded to one another by a layer of material more flexible than each of the magnet portions.

26. The alternator of claim 25 wherein the material of the layer is identical to the adhesive.

27. The alternator of claim 16 comprising a plurality of magnets and a plurality of strips, wherein at least two of the plurality of magnets associated with respective strips.
28. The alternator of claim 27 wherein the respective strips comprise parts that are independent of each other.
29. The alternator of claim 16 wherein the first strip comprises glass fiber embedded in pre-impregnated plastic.
30. (Two Times Amended) An alternator for a vehicle, the alternator comprising:
 - a magnet;
 - two pole pieces having mutually interlaced poles, the poles having grooves profiled substantially axially along [an axis] peripheral sides of each pole body, the magnet interposed in the grooves [and] between two interlaced poles, the groove profile preventing the magnet from escaping perpendicularly from the grooves [in a plane perpendicular to the axis];
 - a strip of nonmagnetic material less hard than the magnet, the strip interposed between the magnet and a portion of at least one of the grooves, the strip covering a circumferential face of the magnet oriented in a direction opposite to a shaft of the alternator; and
 - a layer of adhesive more flexible than the magnet, the layer of adhesive interposed between the strip and the magnet.